## **CLAIMS**

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- 1. A low-profile antenna that provides dual simultaneous operation, comprising:
  - a first antenna having a circular polarization radiation pattern;
  - a monopole antenna including a hollow tube;
- a ground plane; and
  - a support structure that positions said first antenna at a first distance from said ground plane and that positions said monopole antenna between said first antenna and said ground plane.
  - 2. The antenna of Claim 1 wherein said monopole antenna is top-loaded and is formed by locating a disk on top of said hollow tube.
  - 3. The antenna of Claim 1 wherein said first antenna is a spiral antenna with a plurality of arms formed in a material.
  - 4. The antenna of Claim 3 wherein said spiral antenna is a four arm spiral antenna and adjacent arms of said four arm spiral antenna are excited with a phase shift of 180 degrees to transmit/receive circular polarized signals.
  - 5. The antenna of Claim 4 wherein said four arm spiral antenna is fed by a cable with a first conductor and a second conductor, wherein said first conductor connects to a first pair of nonadjacent arms of said four arm spiral antenna and said second conductor connects to a second pair of nonadjacent arms of said four arm spiral antenna.

- 6. The antenna of Claim 5 wherein said cable passes through said hollow tube without making electrical contact with said hollow tube.
- 7. The antenna of Claim 4 wherein said four arm spiral antenna produces a radiation pattern that is maximum at forty-five degrees above the horizon and that is null toward the horizon.
- 8. The antenna of Claim 7 wherein said radiation pattern is symmetric about a center point of said first antenna.
- 9. The antenna of Claim 1 wherein said monopole antenna is fed by a cable with a first conductor and a second conductor, wherein said first conductor is connected to said hollow tube and said second conductor is connected to said ground plane.
- 10. The antenna of Claim 9 wherein said cable excites said monopole antenna with respect to said ground plane to transmit/receive vertical polarized signals.
- 11. The antenna of Claim 10 wherein said monopole antenna produces a radiation pattern that is maximum towards the horizon.
- 12. The antenna of Claim 1 wherein said first antenna and said monopole antenna operate simultaneously.
- 13. The antenna of Claim 1 wherein said first antenna is fed by a first coaxial cable having an inner conductor and an outer conductor and said monopole antenna is fed by a second coaxial cable having an inner conductor and an outer conductor.

- 14. The antenna of Claim 1 further comprising an enclosure located below said hollow tube that contains an additional circuit for the antenna.
- 15. The antenna of Claim 1 wherein said ground plane is a metal surface of a vehicle.
- 16. The antenna of Claim 2 wherein said disk reduces a length of said monopole antenna required for a desired frequency of said monopole antenna to be at a fundamental resonance level.
- 17. The antenna of Claim 16 wherein said disk increases a bandwidth of frequencies of said fundamental resonance level for said top-loaded monopole antenna.
- 18. The antenna of Claim 1 wherein said support structure is a housing including a dielectric material.
- 19. The antenna of Claim 18 wherein said dielectric material includes Lexan polycarbonate and reduces a required length of said monopole antenna.
- 20. The antenna of Claim 1 wherein said first antenna and said monopole antenna operate in a Direct Broadcast Satellite (DBS) radio system.
- 21. The antenna of Claim 3 wherein said material is a low loss dielectric.